

INVESTIGATION OF ACTIVATION CROSS-SECTIONS OF THE PROTON INDUCED NUCLEAR REACTIONS ON NATURAL IRON AT MEDIUM ENERGIES

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Iron is one of the most important structural materials in every field of science, technology, industry, etc. Its application in radiating environment requires the knowledge of accurate excitation functions for the possible reactions in question. By using the Thin Layer Activation technique (TLA) the knowledge of such data is also extremely important even in the case of relative measurements the design the irradiation (irradiation energy, beam intensity, duration) and also for radioactive safety estimations. The cross-sections are frequently measured at low energies but there are unsatisfactory and unreliable data in the energy range above 40 MeV.

As a part of our systematic study for medical, industrial and other purposes high purity iron foils were irradiated at the k=110 AVF cyclotron of the Tohoku University, Japan by using the well established stacked foil technique. For degrading the beam energy and for monitoring purposes aluminum and copper foils were also inserted into the stack. The irradiated samples were measured off-line by high resolution gamma/spectrometry. As a result excitation functions for $^{55,56,57}\text{Co}$, $^{52,54}\text{Mn}$, ^{48}V , $^{48,51}\text{Cr}$, ^{52}Fe and ^{47}Sc were deduced and compared with the literature and theoretical calculations.